At a given London station the data for the half year, October to March, 1917–18, were:

Rainfall, 43 mm.; tar, 0.14 metric ton per square kilometer; carbonaceous matter other than tar, 2.18 tons; insoluble ash, 3.50; soluble ash, 4.15; or total solids, 11.41 tons. Of the soluble matter there were 1.46 tons of sulphate, 0.63 tons of chlorine, and 0.05 of ammonia.

No relationship can be discovered between the deposit of insoluble matter and the amount of rainfall. With the soluble matter, however, it is different, and in general it may be said to vary directly as the rainfall. The relation may be roughly expressed by the formula, $S = 0.058R + 2.5$, where R is the rainfall in mm. and S the deposit of soluble matter in tons per square kilometer. It is not suggested that this expression can be used to find the soluble deposit when the rainfall is known, but gives only the general nature of the relationship.

The report also contains the results of analysis of the rainfall at Georgetown, British Guiana, the nearest land in the direction of the prevailing east-northeast trade winds being the shore of Morocco, distant 3,000 nautical miles. There can be little doubt that the solids contained in the rain waters collected are those normal to the rains of the trade winds, with perhaps some derived from the coastal sea-spray.

The average results over the two years 1916 and 1917 were as follows:

	Solids in solution mg./liter.
Ca	7.95
Mg	3.44
K	2.77
Na	16.36
Al_2O_3	0.58
Fe_2O_3	1.97
SiO_2	0.20
Cl_2	33.93
SO_4	12.02
CO_3	9.78
NO_3	11.57
NH_4	0.12
	100.69

It is shown that 55 per cent of the solids in solution in the rainfall are cyclic sea salts, while 45 per cent must have been derived from atmospheric sources.

The report also contains an account of certain experiments made to determine the best method of measuring continuously the suspended impurity in the air.—*A. M.*

STUDY OF AEROLOGY IN THE AIR SERVICES.

[Reprinted from Aviation, New York, Nov. 15, 1919, p. 354.]

The Aerological School maintained at the Navy Air Station, Pensacola, Fla., will have an accession of 15 enlisted men to start the four months' prescribed course opening on December 1. Six of the students come from the Navy Air Service, three from the Marine Corps and six from the Army Air Service. The class of six with which the school opened is receiving training in aerology preliminary to taking the advanced course which will be maintained at the Weather Bureau in Washington, D. C.

AN INTERESTING OBSERVATION OF ATMOSPHERIC OZONE.

By HENRY I. BALDWIN.

[Dated: Saranac Lake, N. Y., Dec. 1, 1919.]

An interesting observation of ozone in nature was made by the writer on the summit of Haystack Mount (altitude 4918 feet), near Mount Marcy in the Adirondacks at 9:30 a. m., September 8, 1919. The wind at the time was from the west-southwest, having a velocity of approximately 35 miles per hour. The air temperature was probably about 60° F., although no instruments were available for taking observations. Wisps of fracto-stratus cloud were being blown across the rocky peak while 600 feet above were irregular masses of strato-cumulus. In these rapidly moving fragments of fracto-stratus clouds a very strong, pungent odor was perceptible, similar to that noticed near static machines and dynamos. Three hours earlier, that morning, several silent discharges had been seen in the clouds above the mountain, and then, at 3 p. m., a violent thunderstorm broke over the surrounding country.

The writer was at first inclined to believe the odor due to ozone liberated by electricity generated from friction of the clouds with the mountain. One author was found mentioning this as a cause of atmospheric ozone, but Prof. Humphreys's explanation is much more logical:

"There is no reason to expect the atmosphere to become electrified as a result of friction as it blows over mountain peaks, except, perhaps, when it is filled with heavy dust—when it is likely to be already considerably electrified."

"It often happens, however, that mountain peaks give off a great deal of silently discharged electricity, and this discharge may, at times and places, be sufficiently abundant to produce enough ozone and oxides of nitrogen (often mistaken for ozone), to be distinctly perceptible."

Since there was a negligible amount of dust present in this case, the ozone was formed in all probability by some form of electrical discharge which had taken place, or was taking place in the clouds. The effect may have been rendered more noticeable by moisture.

NITROGEN AND OTHER COMPOUNDS IN RAIN AND SNOW.

By J. E. TRIESCHMANN.

[Reprinted from Science Abstracts, Sect. A, Sept. 30, 1919, §1161.]

The paper summarises the results of an analysis of the impurities brought down in rain and snow at Mt. Vernon, Iowa, over a period of eight and one-half months. The town is small and without manufactories, so that there is no excessive local contamination. The precipitation (22¼ inches) supplied during the period 512 pounds of chlorine, 1.5 pounds of sulphates, and 5.3 pounds of nitrates per acre. The presence of the chlorine has been ascribed to salt particles carried from the Atlantic. The average part per million for free ammonia was 0.407; albuminoid ammonia, 0.366; nitrates, 0.255; and nitrites, 0.018. Rain was found to be richer in nitrogen contents than snow. [See also Abs. 146 (1919) to be reprinted in the next issue of the REVIEW.]—*J. S. Di[nes]*.

SIMPLE FORM OF APPARATUS FOR ESTIMATING THE OXYGEN CONTENT OF AIR FROM THE UPPER ATMOSPHERE.

By F. W. ASTON.

[Reprinted from Science Abstracts, Sect. A, Aug. 30, 1919, §1001.]

In the apparatus described a sample of about 10 cm. of air is drawn into a burette and by adjustment of a mercury column is compressed or expanded slightly so as to occupy a standard volume. The height of the mercury column is marked and the air then withdrawn and deoxidised by means of heated phosphorus. It is again

drawn into the measuring apparatus and made to occupy a volume which is equal to 79 per cent of that previously occupied by it. The difference of pressure from the former value is noted. As normal air contains 21 per cent oxygen the second pressure will be approximately equal to the first, and it is the difference between the two which indicates the departure of the oxygen content of the sample from that of normal air. 3 mm. pressure-difference on the mercury column corresponds with 1 per cent difference in oxygen content and readings can be obtained to 1/20th of a mm., or 1/60th of 1 per cent. The results of a test on a known sample of air (20.42 per cent of oxygen) are given. The value obtained by the use of the apparatus was 20.39 per cent.—*J. S. Di[nes]*.

A METHOD OF MEASURING VISIBILITY.

By A. WIGAND.

[Reprinted from Science Abstracts, Sect., A, Aug. 30, 1919, §1000.]

An instrument is described consisting of seven circular transparent glasses, mounted around a rotating disc attached to a frame, which can be fitted over the observer's eye in such a way that the glasses can be brought successively across the field of view while the eye is sheltered from stray side-light. The glasses vary regularly in opacity and are numbered 2, 4, 6, 8, 10, 12, and 14 respectively corresponding to the degree of opacity on an arbitrary but fixed scale. A rotating arm mounted on the axis of the disk carries another transparent glass of which the opacity is 1 on the same scale, so that an observer can interpose an opacity corresponding with any whole number from 1 to 15 between his eye and an object. Definite objects having been selected at various known distances from the observer, the method of observation is to select that transparent glass through which an object can just be seen, and to name as corresponding opacity given by the instrument the number of the glass next higher on the scale, through which the object is invisible. Experiment has shown that on a day of max. visibility the mean opacity number of the instrument is 14.3. If a is the opacity number on any occasion, $14.3-a$ is a measure of the lack of transparency of the atmosphere for the particular object seen, and $(14.3-a)/l$, where l is the distance of the object, is a measure of the lack of transparency of the air for unit distance of the object. The reciprocal of this, namely, $l/(14.3-a)$ is defined as the visibility (*Sicht*) of the air. Certain precautions required for making an observation, a list of causes of deterioration of visibility, and a number of actual observations are also given, together with a diagram which serves for the rapid evaluation of the above quantity for different values of a and l.—*R. C.*

LIGHTNING FIGURES.

In Symons's Meteorological Magazine for December, 1919, is a note by James G. Wood correcting the statement made by Dr. Newell in a note in the October number of the same magazine (abstracted in Monthly Weather Review, October, 1919, p. 729) relative to "impressions of branches and leaves" on the human body due to lightning strokes. Such markings are not uncommon and are due to the "ramification of an electric discharge."—*C. L. M.*

THE TOTAL SOLAR ECLIPSE OF MAY 29, 1919, AT CAPE PALMAS, LIBERIA.[1]

By Dr. LOUIS A. BAUER.

(Author's abstract.)

[Dated: Washington, D. C., Dec. 6, 1919.]

The station at Cape Palmas, Liberia, (lat. 4° 22′ N., long. 7° 43.7′ W.) was one of five principal stations at which magnetic and allied observations were carried out by the Department of Terrestrial Magnetism of the Carnegie Institution of Washington in connection with the solar eclipse of May 29, 1919. Two of these stations, Sobral, Brazil, in charge of Mr. D. M. Wise, assisted by Mr. A. Thomson, and Cape Palmas, Liberia, in the author's charge, who was assisted by Mr. H. F. Johnston, were inside the belt of totality. A third station, at Huayao, Peru, north of the totality belt, was in charge of Dr. H. M. W. Edmonds; the fourth station south of the belt of totality, at Puerto Deseado, Argentina, was in charge of Mr. A. Sterling; and the fifth, about 100 miles north of the belt of totality, at Campo, Cameroun, was in charge of Mr. Frederick Brown. Observations were also made at a secondary station, Washington, by Mr. C. R. Duvall.

In addition to these stations, special magnetic observations were made at the Department's magnetic observatory at Watheroo, Western Australia, and at observatories all over the globe, both inside and outside of the region of visibility of the eclipse. Reports have already been received from many of these foreign observatories. The reports indicate that the magnetic conditions were ideal for the detection of a possible magnetic effect of the order to be expected from our previous eclipse magnetic observations. As soon as the various observations have been examined and discussed, a paper will be presented before the Society upon the results obtained.

The prime object of the present paper is to give a general account of our expedition to Cape Palmas, Liberia, also to relate the phenomena observed during the total eclipse, and the experiences encountered en route to Liberia and in Liberia itself.

Totality lasted at Cape Palmas about 6 minutes and 33 seconds, longer than at any other accessible station in the belt of totality. The general indications, as the eclipse occurred during the rainy season, were that Cape Palmas would not be a suitable station for the astronomer. However, for the purpose of our investigations, it did not matter whether we had a clear sky or not, for a magnetic effect will pass through any layer of clouds. It happened, however, that in spite of general expectation, we had clear weather, and this now for the third time, whereas parties at other stations which appeared more favorable according to past meteorological records, were unfortunate. Our observation program included magnetic and electric observations, meteorological observations, shadow band observations, times of contacts and photographs such as could be obtained with our small Kodak cameras. This comprehensive program was carried out successfully, excepting the atmospheric-electric work which, owing to the deterioration of the dry-cell batteries purchased in England, had to be abandoned. Although I had stationed three observers, no shadow bands were observed this time, even greater

[1] Presented before the Philosophical Society of Washington, Oct. 11, 1919.